Developing a Decision Support System for Control of Aquatic Invasive Species
Current Status and Progress

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My proposal to the MRBP outlined two major phases of work for me to develop a decision support tool to aid in the management of aquatic invasive species. The first phase was to conduct a series of interviews with natural resource managers responsible for managing established aquatic invasive species. The second phase will use the results of these interviews to inform the scope, content and details of a decision support tool.

Over the last year I have conducted 31 interviews with federal, state, and local natural resource managers across the country and with members of interested stakeholder groups (i.e. NGOs and research groups). These interviews allowed me to draw on their real world experience of what issues are of greatest concern and how a decision support tool could be of greatest use to them. Although I am in the midst of analyzing these results, I can present two major preliminary findings now. First, when managers were asked which attributes and ecosystem services of waterbodies they were most concerned with protecting, the most frequently given responses were biodiversity, water quality, and recreational opportunities (Figure 1). Thus, I will aim to have the decision support tool emphasize assessment of impacts to these attributes. Second, the interviews indicated that managers thought that a useful decision support tool should be spatially explicit. In the 31 interviews, there were 11 distinct references to the need for a decision support tool to help prioritize geographical areas for management or decide where in a landscape limited funds should be spent. I aim to complete and write up the interview analysis by winter 2009.

Upon completion of the interview analysis, I will move to working on tool creation full time. However, the initial steps of tool creation have already begun. One key finding from the interviews was the need for making the decision support tool spatially explicit, something I had not originally envisioned but have now decided to do. This requires linking the management recommendations to GIS data and maps of the management area. I will build the tool as a series of GIS maps and information combined with an expert system software program. The GIS data will be included through ESRI's ArcGIS software, as this software is widely used and should make the tool more easily accessible. The decision to include GIS was made because it allows managers to make decisions based on the surrounding landscape conditions rather than viewing areas targeted for AIS control in isolation. The expert system would be the type outlined by Starfield and Bleloch[1]. I have chosen this type of decision tool because it allows inclusion of qualitative data and increases transparency of the decision making process. The goal will be to help managers decide whether and where to take certain types of actions within their management area. This decision support tool will be built for Minnesota, but an accompanying document will explain the process and rational behind the tool's development so as to provide a roadmap for developing a similar tool for other management areas. Over the last six months, I

[1] Starfield, A.M. and Bleloch, A.L. 1991. Building models for conservation and wildlife management. Second edition, The Burgess Press, Edina, Minnesota.

have become proficient in the use of ArcGIS software and have begun searching for an appropriate expert system shell. Over the next several months I will be identifying and gathering the information sources needed for inclusion in the decision support tool and developing the logic for the expert system.

One of the ways the decision support tool will be evaluated is through a workshop with managers that will outline the tool creation process, use, example cases, and procedures for tool modification. Managers' responses to the tool will be documented in comment sheets that I will distribute before and after the workshop. I am aiming to have a preliminary version of the tool ready so that this workshop could be run at the next MRBP meeting in June 2010, if the MRBP is interested. I am currently aiming to have a final version of the tool finished by winter 2010.

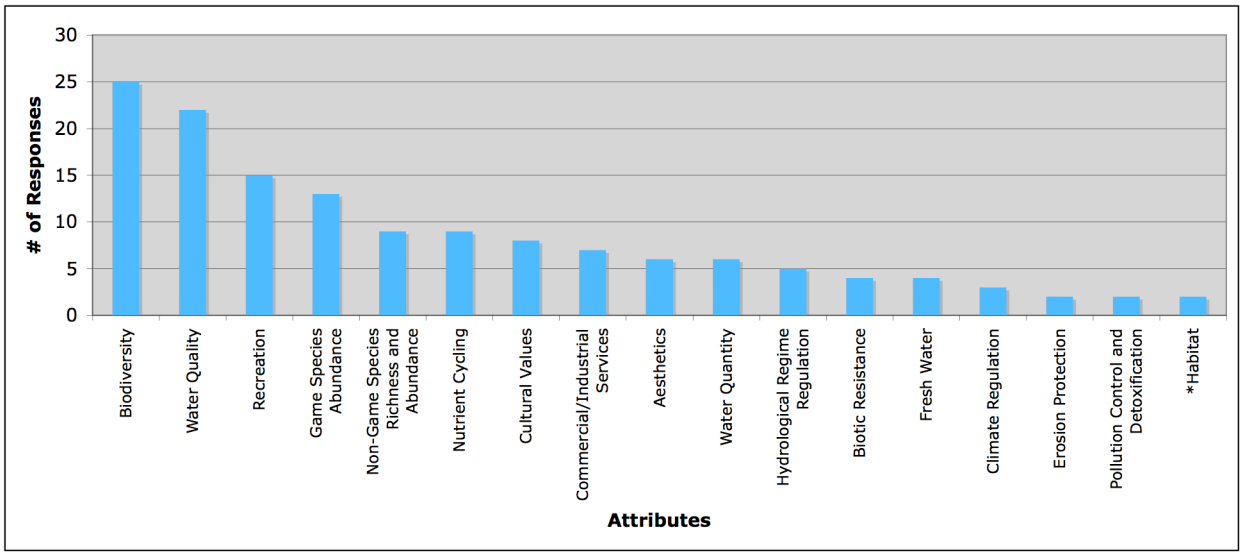

Figure 1. Top attributes as identified by municipal and state land managers.
I presented managers with a list of 22 attributes and services related to fresh waterbodies and asked them to select the top five attributes that they were most concerned with protecting. Figure 1 shows the frequency with which each attribute was chosen. This version of the graph only shows those attributes that were chosen more then once.
*Managers were also given the option of adding another attribute under "Other". The responses on Figure 1 denoted with stars are these responses.